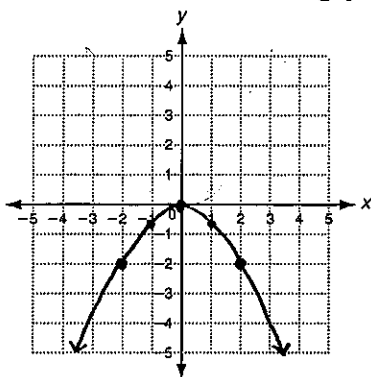


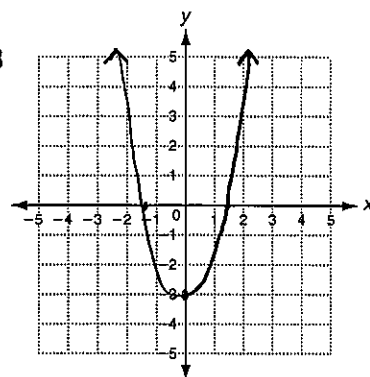
Chapter 6 Review #2 (Holt)

Graph each quadratic function using your calculator.

1. $y = -\frac{1}{2}x^2$



2. $y = 2x^2 - 3$



Tell whether the graph of each function opens upward or downward. Explain.

3. $y = (-3)x^2 + 5$

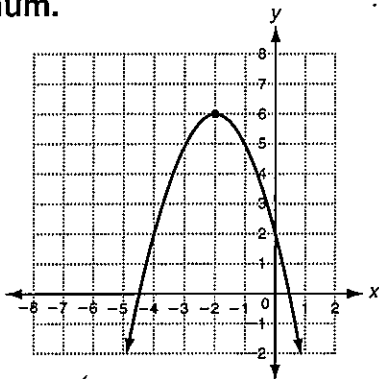
down; a is negative

4. ~~$y = 8x^2$~~ $y = 8(+1)x^2$

up, a is positive

For each parabola, a) identify the vertex; b) tell whether it has a minimum or maximum.

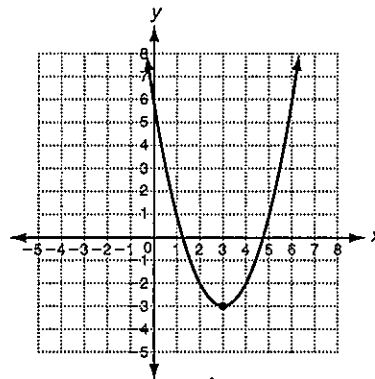
5.



a. $(-2, 6)$

b. maximum

6.

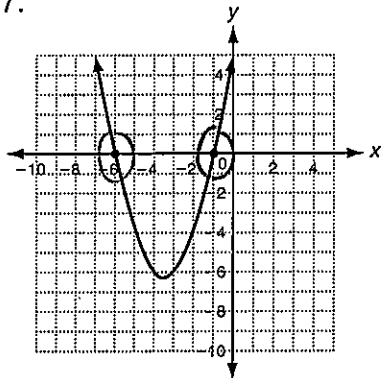


a. $(3, -3)$

b. minimum

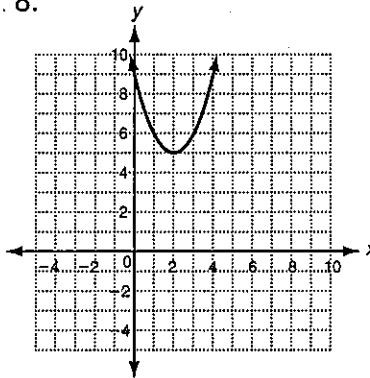
Find the zeros of each quadratic function by looking at its graph.

7.



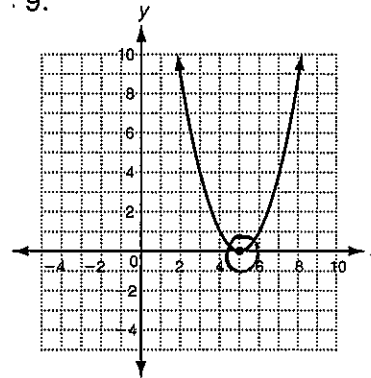
-6 & -1

8.



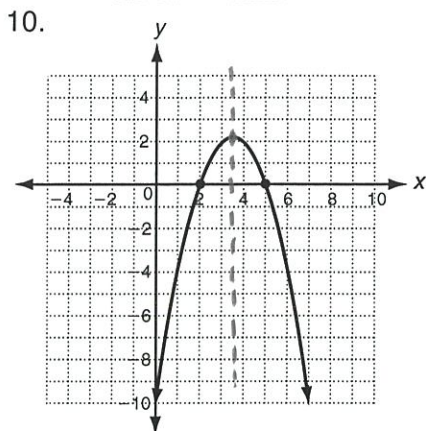
none

9.

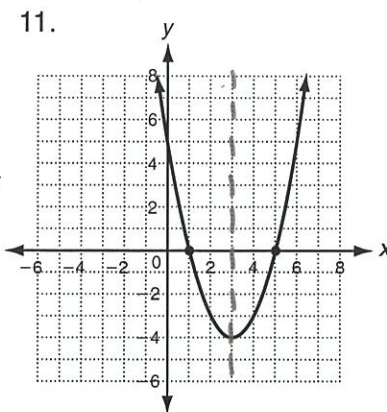


5

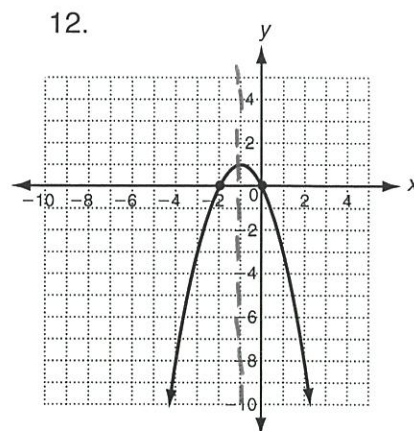
Find the axis of symmetry of each parabola.



$x = 3.5$



$x = 3$



$x = -1$

$h = \frac{-b}{2a}$
 $h = \frac{-(-6)}{2 \cdot 3}$
 $h = \frac{6}{6} = 1$

For each quadratic function, find the axis of symmetry of its graph.

13. $y = 3x^2 - 6x + 4$

$x = 1$

14. $y = -x^2 + 4x$ $h = \frac{-4}{2 \cdot (-1)} = -\frac{4}{-2} = 2$

$x = 4$

15. $y = 4x^2 + \frac{1}{2}x + 3$ $h = \frac{-\frac{1}{2}}{2 \cdot 4} = \frac{-\frac{1}{2}}{8}$

$h = -.0625$

Find the vertex of each parabola.

16. $y = 3x^2 - 6x - 2$

$(1, -5)$
 $y = 3(x-1)^2 - 5$

17. $y = 3x^2 + 12x - 10$

$(-2, -22)$
 $y = 3(x+2)^2 - 22$
 $3(-2)^2 + 12(-2) - 10 = -22$

18. $y = x^2 + 2x - 35$

$(-1, -36)$
 $y = (x+1)^2 - 36$
 $(-1)^2 + 2(-1) - 35 = -36$

Graph each quadratic function.

19. $y = x^2 + 4x - 4$

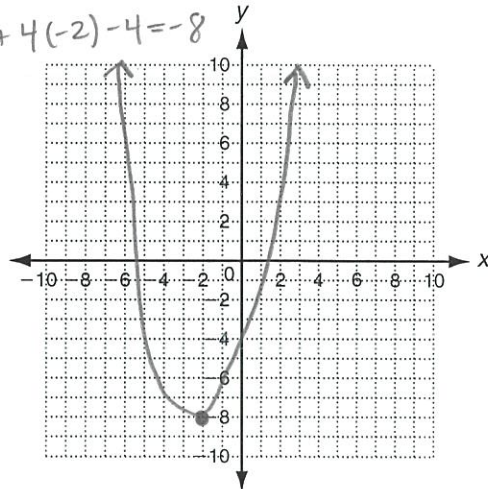
$h = \frac{-4}{2 \cdot 1} = \frac{-4}{2} = -2 \rightarrow (-2)^2 + 4(-2) - 4 = -8$

$x = h$ axis of symmetry: $x = -2$

(h, k) vertex: $(-2, -8)$

y-intercept: _____

two other points: $y = (x+2)^2 - 8$
 vertex form



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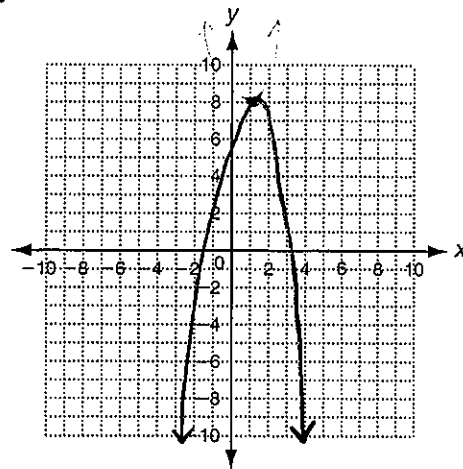
$y = -2x^2 + 4x + 6$ $\frac{-4}{2 \cdot -2} = \frac{-4}{-4} = 1$ $-2(1)^2 + 4(1) + 6$
 20. $y + 2x^2 - 4x - 6 = 0$

$x = h$ axis of symmetry: $x = 1$

(h, k) vertex: $(1, 8)$

~~y-intercept:~~ _____

~~vertex form:~~ $y = -2(x-1)^2 + 8$
 vertex form



Order the functions from narrowest graph to widest.
 $a > 1$ skinny $a < 1$ wide

21. $f(x) = 3x^2$; $g(x) = -2x^2$

$3x^2, -2x^2$

22. $f(x) = \frac{1}{2}x^2$; $g(x) = 5x^2$; $h(x) = x^2$

$5x^2, x^2, \frac{1}{2}x^2$

23. $f(x) = 4x^2$; $g(x) = -3x^2$; $h(x) = \frac{1}{4}x^2$

$4x^2, -3x^2, \frac{1}{4}x^2$

24. $f(x) = 0.5x^2$; $g(x) = \frac{1}{4}x^2$; $h(x) = \frac{1}{3}x^2$

$0.5x^2, \frac{1}{3}x^2, \frac{1}{4}x^2$

Give the transformation of each function compared to the graph of $y = x^2$.

25. $y = (x-3)^2 + 1$ right 3, up 1

$T(3, 1)$

26. $y = (x+3)^2 - 4$ left 3, down 4

$T(-3, -4)$

27. $y = x^2 + 7$ up 7

$T(0, 7)$

Solve each equation.

28. $\frac{3x^2}{3} = \frac{108}{3}$

$\sqrt{x^2} = \sqrt{36}$

$x = 6$ or $x = -6$

29. $\frac{100}{4} = \frac{4x^2}{4}$

$\sqrt{25} = \sqrt{x^2}$

$5 = x$ or $x = -5$

30. $x^2 + 7 = 71$

$\sqrt{x^2} = \sqrt{64}$

$x = 8$ or $x = -8$

31. $49x^2 - 64 = 0$
 $+64 +64$

$\frac{49x^2}{49} = \frac{64}{49}$

$\sqrt{x^2} = \sqrt{\frac{64}{49}}$

$x = \frac{8}{7}$
 or
 $x = -\frac{8}{7}$

32. $\frac{-2x^2}{-2} = \frac{-162}{-2}$

$\sqrt{x^2} = \sqrt{81}$

$x = 9$ or $x = -9$

33. $9x^2 + 100 = 0$
 $-100 -100$

$\frac{9x^2}{9} = \frac{-100}{9}$

$\sqrt{x^2} = \sqrt{-11.1}$

no solutions

34. The height of a skydiver jumping out of an airplane is given by $h = -16t^2 + 3200$. How long will it take the skydiver to reach the ground? Round to the nearest tenth of a second.

$\approx 2.8 \text{ sec.}$

* calculator!

Solve to find the **roots**. \rightarrow Quad Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

35. $x^2 + x = 12$ $a=1, b=1, c=-12$
 $\frac{-1 \pm \sqrt{1^2 - 4(1)(-12)}}{2 \cdot 1} = \frac{-1 \pm \sqrt{49}}{2} = \frac{-1 \pm 7}{2}$

3 & -4

36. $4x^2 - 17x - 15 = 0$ $a=4, b=-17, c=-15$
 $\frac{-(-17) \pm \sqrt{(-17)^2 - 4(4)(-15)}}{2 \cdot 4} = \frac{17 \pm \sqrt{529}}{8} = \frac{17 \pm 23}{8}$

5 & -0.75

37. $2x^2 - 5x = 8$ $a=2, b=-5, c=8$
 $\frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(8)}}{2 \cdot 2} = \frac{5 \pm \sqrt{49}}{4} = \frac{5 \pm 7}{4}$

3 & -0.5

38. $3x^2 + 14x - 5 = 0$ $a=3, b=14, c=-5$
 $\frac{-14 \pm \sqrt{14^2 - 4(3)(-5)}}{2 \cdot 3} = \frac{-14 \pm \sqrt{256}}{6} = \frac{-14 \pm 16}{6}$

.3 & -5

39. $x^2 + 8x + 15 = 0$ 40. $x^2 - 49 = 0$

41. $6x^2 + x - 1 = 0$ 42. $x^2 + 8x - 20 = 0$

Discriminant: $b^2 - 4ac$

Find the **number of solutions** to each equation.

39. $x^2 + 25 = 0$ $a=1, b=0, c=25$
 $0^2 - 4 \cdot 1 \cdot 25 = -100$

none

40. $x^2 - 11x + 28 = 0$ $a=1, b=-11, c=28$
 $(-11)^2 - 4 \cdot 1 \cdot 28 = 9$

2 solutions

41. $x^2 + 8x + 16 = 0$ $a=1, b=8, c=16$
 $8^2 - 4 \cdot 1 \cdot 16 = 0$

1 solution

42. A baseball player hits a ball with a velocity of 45 ^m/s from a height of 1 meter.

a. Write an equation to represent this situation. $h = -4.9t^2 + 45t + 1$

b. Find the height of the ball after 2 seconds. 71.4 m

calc!

$h = -\frac{1}{2}gt^2 + v_0t + h_0$
 $-\frac{1}{2} \cdot 9.8 \cdot t^2 + 45t + 1$

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① Get "y" alone ② FOIL

Write each equation in standard form.

43. $y - 6 = (x + 3)^2 - 6$
 $(x + 3)(x + 3) - 6$
 $x^2 + 3x + 3x + 9 - 6$
 $x^2 + 6x + 3$

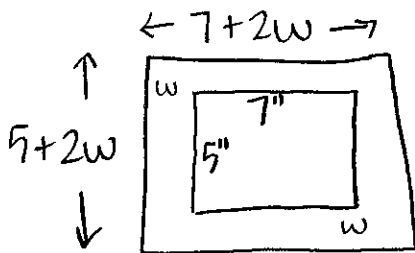
44. $y = 2(x + 3)^2 - 5$ $2(x + 3)(x + 3) - 5$
 $2(x^2 + 6x + 9) - 5$
 $2x^2 + 12x + 18 - 5$
 $2x^2 + 12x + 13$

Expand and simplify. FOIL!

45. $(x + 5)^2 + 2$ $(x + 5)(x + 5) + 2$
 $x^2 + 5x + 5x + 25 + 2$
 $x^2 + 10x + 27$

46. $(x + 5)^2 - 3$ $(x + 5)(x + 5) - 3$
 $x^2 + 5x + 5x + 25 - 3$
 $x^2 + 10x + 22$

47. If a 5" by 7" photo is framed with a width of w around the photo, find the area of photo and frame.



$(7 + 2w)(5 + 2w)$ FOIL!

$35 + 14w + 10w + 4w^2$

$35 + 24w + 4w^2$

48. A decorator is wallpapering a wall that is 12 feet by 11 feet. If the decorator needs to use the exact amount of wallpaper from that wall to wallpaper another wall in the shape of a square, what would the side length of the square wall have to be?

$12'$
 $11'$
 $11 \cdot 12 = 132$

x
 x
 132

$x \cdot x = 132$

$\sqrt{x^2} = \sqrt{132}$

$x = 11.5 \text{ ft}$